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NOTES ON THE BOTRYCHIA

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(With *Plate I*)

The fern collector who is much in the woods and fields, sooner or later is certain to have the ecological peculiarities of the various species thrust upon him. One species grows upon limestone, another in a swamp, a third on wooded hillsides, and so on throughout the list.

My attention was first called to the clannishness of the botrychia by a friend, Atty. R. J. Webb, of Garrettsville, Ohio, a very careful observer, who, under date of May 14, 1907, wrote: "The most interesting fact revealed by my studies of the botrychia is the remarkable clannishness of the species. They seem to love each other's society and where one grows the others do also.

Botrychium lanceolatum (Gmel.) Ångstr., *Botrychium virginianum* (L.) Sw., and *Botrychium obliquum* Muhl. grow within a few feet or yards of the two stations that I know for *Botrychium ramosum* (Roth.) Aschers. (*Botrychium matricariæfolium* A.Br.). At the other three stations for *Botrychium lanceolatum* (Gmel.) Ångstr., it is in company with *Botrychium virginianum* (L.) Sw. and in one or more cases with *Botrychium obliquum* Muhl."

Since then I have noted many instances of similar association of the various species of botrychia.

Near Troy, Miami Co., Ohio, a group of approximately one hundred plants was seen, including *Botrychium obliquum* Muhl., *Botrychium dissectum* Spreng., as well as several plants intermediate between the two. The plants grew in an open woods within a radius of twenty-five yards.

At Chesterland Caves, Geauga Co., Ohio, *Botrychium*

ramosum (Roth.) Aschers. and *Botrychium lanceolatum* (Gmel.) Ångstr. were seen growing together on July 2, 1908, immediately in front of the hotel at this resort. If any of the other species of botrychia ever grew in the same spot, being larger and more conspicuous, they have been plucked up and exterminated.

Near Burton in the same county, *Botrychium dissectum* Spreng. and *Botrychium obliquum* Muhl. and its varieties (as yet undetermined) grow in a moist, sandy bottom field of four or five acres in such profusion that even a modest estimate would sound almost absurd. Fifty-six plants were counted in a space estimated at twenty feet square. They were almost as numerous in other parts of the field.

A similar grouping was noted in the fall of 1909 near Cheswick, Allegheny Co., Pa. In this instance *Botrychium dissectum* Spreng., *Botrychium obliquum* Muhl., *Botrychium obliquum* v. *oneidense* (Gilbert) Waters and a form very suggestive of the variety *tenuifolium* (Und.) Gilbert were found rather plentifully within a few yards of each other.

The probable explanation of this grouping together of these plants is to be found in the fact that they are rather exacting as to the ecological conditions under which they will grow best, and wherever these conditions obtain the plants are likely to occur rather plentifully.

Curiosity prompted the measurement of the roots of two specimens of *Botrychium virginianum* (L.) Sw. collected near Trafford City, Allegheny Co., Pa., May 28, 1910. The specimens were taken at random from a group of perhaps twenty plants of the same species. In each case a small part of the root system was probably lost since the idea of measuring the roots was not thought of until the plants were being prepared for pressing, and no special care had been used in taking them up. The combined length of the roots of one



Plate I
(About natural size)

plant was 278 inches; of the other 312 inches. The roots were pressed and will be mounted with the plants although every one knows the roots of the botrychia are very brittle and difficult of preservation when dried.

In "The Fern Flora of Ohio" (Fern Bulletin, Jan. 1907) mention was made of the reproduction of the botrychia in some cases at least by a short thick root-stock. Since that time I have found two mature fruiting fronds of *Botrychium ramosum* (Roth.) Aschers., attached to the same rootstock as shown in *Plate I*. Also a specimen of *Botrychium obliquum* Muhl. having two sterile fronds and a bud for a third, all on the same rootstock, was found late last fall at Cheswick, Allegheny Co., Pa.

Although Christensen's "Index Filicum" and other authorities list *Botrychium dissectum* Spreng. as a separate species, it is rather difficult for an amateur to understand why it should be so regarded. Seen by itself on the mounted sheet there is no doubt a very marked difference between the typical *dissectum* and the typical *obliquum*; but when one finds, as any one who cares to look for it may find, the typical forms of *obliquum* and *dissectum* with a complete set of intermediate forms and all growing within a few feet of each other, then the differences do not seem so striking. I have never seen *dissectum* growing except in company with *obliquum* and always with the intermediate forms. If *dissectum* is a valid species, what are the intermediate forms?

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